TIGGER Transit Investments for Greenhouse Gas and Energy Reduction

U.S. Department of Transportation
Federal Transit Administration

Courtesy of CUMTD

Project name: Champaign-Urbana Geothermal HVAC System

Transit agency: Champaign-Urbana Mass Transit District (CUMTD)

Location: Champaign-Urbana, east central Illinois

TIGGER goal: GHG emissions reduction

FTA region number: V

Award amount: $450,000

Congressional district: IL district 15

Funding mechanism: Recovery Act (ARRA)

Geothermal HVAC Saves Energy, Cuts Emissions at CUMTD

The Champaign-Urbana Mass Transit District (CUMTD) is installing a geothermal heating, ventilation, and air conditioning (HVAC) system with funding from the TIGGER Program. This $450,000 project will reduce the fossil fuel used for the 15,000 square foot CUMTD administration building while cutting overall greenhouse gas emissions.

Geothermal Project

Facility Project

The geothermal system is designed to reduce energy consumption by creating a closed loop system to tap normal ground temperatures. This geothermal HVAC installation uses indoor water source heat pumps along with a glycol-and-water solution to exchange heat between the Earth and the heat pumps via a ground loop. The system takes advantage of the natural heat storage capacity of the ground, providing cooling by moving heat to the ground as a heatsink, while allowing heating by extracting heat from the ground. The ground loop will be installed in a series of vertical boreholes with thermally enhanced grout buried nearby to fully exploit the natural heat exchange process under ground.

CUMTD operates buses in the twin cities of Champaign-Urbana, home to the University of Illinois. CUMTD serves an urbanized population of approximately 130,000, and provides more than 10 million rides annually, in part because of its close relationship with the university. This section of central Illinois is known for developing new technology, and the transit district has played a role by taking innovative initiatives including the use of hybrid buses in its fleet. As a result of its record, CUMTD (commonly referred to as MTD) has received the American Public Transit Association's Outstanding Achievement Award twice. CUMTD is committed to providing sustainable and environmentally friendly practices.

Courtesy of CUMTD

Drilling the geothermal well at CUMTD's administrative building.

Geothermal HVAC is a proven technology with widespread acceptance, particularly in hot and cold climates where building operators face high heating and cooling costs. In its Upper Midwest location, CUMTD is faced with both cold winters and hot summers, and geothermal HVAC is a cost-effective alternative to conventional heating and cooling designs.

Compared to the current HVAC system, the new system will reduce electrical energy usage by 40%, cut natural gas usage by 60%, and decrease carbon dioxide greenhouse gas emissions by 133 metric tons. The reduced emissions will directly improve local air quality and help CUMTD operate its business at a lower cost.

Impact:

The geothermal HVAC project will reduce CUMTD's electrical energy usage by 40% and cut its natural gas usage by 60%.

Local contractors A&R Mechanical will provide the hardware and GHR Engineering will install the system it has designed. CUMTD expects to reach economic payback on the capital cost of the system in three to five years.

For More Information

CUMTD:
www.cumtd.com

FTA TIGGER:
www.fta.dot.gov/TIGGER

About TIGGER

The Transit Investment for Greenhouse Gas and Energy Reduction (TIGGER) Program *was established in 2009 by the U.S. Department of Transportation's Federal Transit Administration (FTA). Designed to reduce energy use and greenhouse gas emissions in transit agencies around the country, the TIGGER Program made funds available for capital investments that would reduce greenhouse gas emissions or lower the energy use of public transportation systems. An initial $100 million in American Recovery and Reinvestment Act grants funded 43 competitively-selected transit projects. In 2010, the FTA provided an additional $75 million in grants to fund 27 new TIGGER projects. These 70 projects are employing a variety of technologies to meet the program goals, including solar installations, building efficiency improvements, wind technology, wayside energy storage for rail, and purchase of more efficient buses. In fiscal year 2011, FTA provided an additional $49.9 million to continue the program.*

TIGGER

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